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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,201	12/05/2003	Thomas Beck	2002P06120WOUS	2440

7590 12/13/2006

SIEMENS CORPORATION  
INTELLECTUAL PROPERTY DEPT.  
170 WOOD AVENUE SOUTH  
ISELIN, NJ 08830

EXAMINER
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SONG, MATTHEW J

ART UNIT	PAPER NUMBER
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1722

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/729,201

Applicant(s)

BECK ET AL.

Examiner

Matthew J. Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 and 11-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

#### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/8/2006 has been entered.

#### ***Priority***

2. Acknowledgment is made of applicant's claim for priority under 35 U.S.C. 119(a)-(d) based upon an application filed in Germany on April 15, 2002. A claim for priority under 35 U.S.C. 119(a)-(d) cannot be based on said application, since the United States application was filed more than twelve months thereafter.

3. Acknowledgment is made of applicant's claim for priority under 35 U.S.C. 119(a)-(d) based upon an application filed in Germany on September 19, 2002. A claim for priority under 35 U.S.C. 119(a)-(d) cannot be based on said application, since the United States application was filed more than twelve months thereafter.

#### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-9 and 11-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 recites, “rectangular geometry with a width corresponding to a width of the surface to be melted and a length in a direction of movement of the focal spot transverse to the width that is less than the width” in lines 5-7. The original specification does not teach “a width corresponding of the surface to be melted”. The only possible support would be in Figure 3, however the figure does not support the limitation because the width of the broken lines is greater than the width of the area to be melted. Also, the focal spot in Figure 3 is rectangular, not elliptical or linear. The same arguments apply to independent claim 15, and claims 2-9, 11-14 and 16-22 are rejected because they depend from claims 1 and 15.

#### ***Claim Objections***

6. Claims 1, 12, and 13 recites the limitation "the focus length" in line 10 of claim 1; in line 5 of claim 12; and in line 5 of claim 13. There is insufficient antecedent basis for this limitation in the claim.

#### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-4, 11, 14 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurz et al (US 6,024,792) in view of Foster et al (US 6,333,484).

Kurz et al discloses a method of manufacturing monocrystalline structures on substrates. (Abstract.) The method is an epitaxial one (col2, ln 1-10) which utilizes an energy sources having a focal point at the surface to be melted. (col 2, ln 40-67). Laser beams, electron beams and arc methods are suitable. (col 2, ln 45-60) The melted material solidifies into the monocrystalline structure. (co 15, ln 1-67). A feed material is supplied to the area to be melted and is incorporated into the monocrystalline structure of the substrate and the material is completely melted. (col 5, ln 1-67 and claim 1). The arrow in Figure 4 shows movement in a single direction, (col 5, ln 60-67) this clearly suggests applicant's direction transverse to the width only. The power and thus the temperature of the beam is selected to ensure dendritic growth and material are metallic superalloys (col 6, ln 10-20 and col 1, ln 5-55). Kurz et al also

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teaches the a round focal spot having a diameter of the laser spot is 2.5 mm (col 4, ln 60-67 and Fig 4), this clearly applicant's focal spot having a substantially elliptical geometry because the spot has a length and the spot is a laser spot, i.e. focus light. Kurz et al also teaches energy input with the energy beam is controlled in such a manner that the speed of the solidification and the temperature gradient lie in the dendritic crystalline region (col 6, ln 1-20). Kurz et al also teaches layering multiple epitaxial layers on top of each other (col 5, ln 20-35).

Kurz et al does not teach controlling a temperature of the focused length of the energy source by an optical system to determine when a next epitaxial is to be formed.

In a method of directional solidification of superalloys, note entire reference, Foster et al teaches the temperature of a weld area is controlled throughout the process in spite of added heat from the laser beam by using an optical pyrometer (col 3, ln 35-55). Foster et al also teaches a computer numerical control (CNC) controls the laser and the control means includes a vision system (col 4, ln 45-60).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kurz et al by using the optical pyrometer and CNC control system to measure temperature and control the laser, as taught by Foster et al, to accurately control the speed of solidification and the temperature gradient within a dendritic crystalline region, thus determines when the next epitaxial layer is formed ('792 col 5, ln 20-40 and col 6, ln 10-20).

Referring to claim 1, the combination of Kurz et al and Foster et al does not teach the shape of the focal spot has a length less than the width. The combination of Kurz et al and Foster et al teaches a round shape. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kurz et al and Foster et al by having a

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round shape where the length is less than the width because changes in shape are held to obvious (MPEP 2144.04).

Referring to claim 2-3, the combination of Kurz et al and Foster et al teaches laser and electron beams ('792 col 2, ln 45-55).

Referring to claim 4, the combination of Kurz et al and Foster et al teaches a substantially elliptical spot.

Referring to claims 11 and 14, the combination of Kurz et al and Foster et al teaches monocrystalline metallic super-alloy structures ('792 Abstract).

Referring to claim 22, the combination of Kurz et al and Foster et al teaches an optical pyrometer.

9. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurz et al (US 6,024,792) in view of Foster et al (US 6,333,484) as applied to claims 1-4 and 14-20 above, and further in view of Marcin et al (US 6,103,402).

The combination of Kurz et al and Foster et al teaches all of the limitations of claim 7, as discussed previously, except feed of material is varied in terms of time and location.

Marcin et al teaches method of making crack free metallic articles using an energy beam, note entire reference. Marcin et al teaches incorporating a filler material into a super-alloy by the application of an energy beam. In example 1, Marcin et al teaches that a first spot power (and thus, spot temperature) and spot size were used followed by a second spot power and size. (col 7, ln 45 to col 8, ln 60). Marcin et al also teaches a powder feed was used to supply a powder to the melted areas of the substrate. Marcin et al also teaches powder flow rates may be between 0.5

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g/min and about 50 g/min depending upon filler material, beam spot size and power density (col 7, ln 1-25). Thus Marcin et al teaches varying power and varying the feed of material depending on the beam density.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kurz et al and Foster et al varying the material as taught Marcin to produce a crack free material (col 8, ln 5-50).

*Allowable Subject Matter*

10. Claim 5, 6, 9, 12 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: The closest prior art is Kurz et al (US 6,024,792). Kurz et al teaches direction solidification using an energy, where the energy input with the energy beam is regulated and/or controlled in such a manner that the speed of solidification and the temperature gradient lie in the dendritic crystalline region (col 6, ln 1-65). Kurz et al does not teach or suggest the intensity of the energy input is increased at the profile ends as compared with the middle area of the focal spot. Referring to claim 5, Kurz et al does not teach or suggest the width of the spot is changed during operation in response to a sensed width of the surface to be melted. Referring to claim 9, 12 and 13, Kurz et al does not teach or suggest adapting the focal spot to the area to which material is added.



***Response to Arguments***

12. Applicant's arguments with respect to claims 1-9 and 11-22 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
**ROBERT KUNEMUND  
PRIMARY EXAMINER**

Matthew J Song  
Examiner  
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MJS

December 10, 2006